

Configuring LDAP Directory Search on SPA SIP IP Phones



Contents

Introduction	3
Audience	3
Scope	3
Related Documents	3
Overview	4
Requirements	4
Configuring LDAP	4
Using LDAP	6
FAQs	7
Troubleshooting LDAP	8
Sample LDAP Traces	8
Gathering Information for Support	13

Introduction

The Lightweight Directory Access Protocol (LDAP), is described by Request for Comments (RFC) 4510 as "... an Internet protocol for accessing distributed directory services..."

The LDAP Corporate Directory Search feature, when configured and enabled on a SPA SIP IP phone, allows a user to search a specified LDAP directory for a name, phone number, or both. LDAP-based directories, such as Microsoft Active Directory 2003 and OpenLDAP-based databases, are supported.

Audience

This application note is targeted at anyone who administers or maintains a SPA9000 Voice System. It is expected that readers of this document are familiar with the administration tasks involved with configuring SPA9000 Voice System components and configuring an LDAP client.

Scope

This scope of this document is limited to configuring LDAP on SPA SIP IP phones as part of a SPA9000 Voice System and does not address the following topics:

- Configuring LDAP servers
- Security

Refer to the Related Documents for additional configuration and background information.

Related Documents

- Cisco Small Business SPA9000 Voice System Installation and Configuration Guide: System Configuration Using the SPA9000 Setup Wizard, Version 2.1
- Cisco Small Business SPA9000 Voice System Version 6.1 Installation and Configuration Guide: Web-UI (Legacy) Based Product Configuration
- Cisco Small Business SPA9000 Voice System Version 6.1 Administration Guide
- Cisco Small Business IP Phones Admin Guide
- Cisco Small Business IP Phones User Guide
- RFC4510: Lightweight Directory Access Protocol (LDAP): Technical Specification Road Map
- RFC4514: Lightweight Directory Access Protocol (LDAP): String Representation of Distinguished Names
- RFC4515: String Representation of LDAP Search Filters
- Open LDAP:<http://openldap.org>
- Microsoft Active Directory 2003:
<http://www.microsoft.com/windowsserver2003/adam/default.msp>

Overview

Configuring the SPA phones as LDAP clients is a relatively trivial task. Troubleshooting configuration problems due to incorrectly typed information in configuration fields requires advanced network and LDAP troubleshooting skills. This application note walks you through configuring an LDAP client and also provides sample traces that may be of use to you when you are troubleshooting your LDAP environment.

Requirements

You need the following equipment and services:

- A functional LDAP server such as OpenLDAP or Microsoft's Active Directory Server 2003
- A SPA phone running at least 6.1.3a software on a functional network

Configuring LDAP

Before you use the LDAP Corporate Directory Search feature of your phone, you need to configure some basic information.

1. Navigate to the phone's admin web user interface (web-UI) as an administrator.
2. Define the System tab > Optional Network Configuration > Primary DNS: <IP address>. **Note:** The IP address is only required if using Active Directory 2003 with authentication set to MD5
3. Define the System tab > Optional Network Configuration > Domain: <LDAP_domain>. **Note:** The IP address is only required if using Active Directory 2003 with authentication set to MD5. Some sites may not deploy DNS internally and instead use Active Directory 2003. In this case, it is not necessary to enter a Primary DNS address and an LDAP Domain. However, with Active Directory 2003, the authentication method is restricted to Simple.
4. Define the fields at the Phone tab > LDAP Corporate Directory Search > as follows:

The screenshot shows the configuration page for the Phone tab, specifically the LDAP Corporate Directory Search section. The page has a navigation bar at the top with tabs: Info, System, SIP, Provisioning, Regional, Phone (selected), Ext 1, Ext 2, Ext 3, Ext 4, Ext 5, Ext 6, User, and SPA932. The main content area is titled "LDAP Corporate Directory Search" and contains the following fields:

LDAP Dir Enable:	no	LDAP Corp Dir Name:	
LDAP Server:		LDAP Auth Method:	None
LDAP Client DN:		LDAP Password:	
LDAP Username:			
LDAP Search Base:			
LDAP Last Name Filter:		LDAP First Name Filter:	
LDAP Search Item 3:		LDAP Item 3 Filter:	
LDAP Search Item 4:		LDAP item 4 Filter:	
LDAP Display Attrs:			
LDAP Number Mapping:			

Below the LDAP section is the "Extension Mobility" section with the following fields:

EM Enable:	no	EM User Domain:	
------------	----	-----------------	--

- a) **LDAP Dir Enable:** Select **yes** to enable LDAP and cause the name defined in LDAP Corp Dir Name to appear under the Directory menu. [no/yes]
- b) **LDAP Corp Dir Name:** Enter a free-form text name, such as "Corporate Directory."

- c) **LDAP Server:** Enter a fully qualified domain name or IP address of LDAP server, in the following format: nnn.nnn.nnn.nnn
- d) **LDAP Auth Method:** Select the authentication method that the LDAP server requires, such as DIGEST-MD5 [None/Simple/DIGEST-MD5]
- e) **LDAP Client DN:** Enter the distinguished name domain components [dc] , such as "dc=cv2bu,dc=com"

Example: If using the default Active Directory schema of:

(Name(cn)->Users->Domain), the client DN would be:

cn="David Lee",dc=users,dc=cv2bu,dc=com

- f) **LDAP Username:** Enter the username for a credentialed user on the LDAP server.
- g) **LDAP Password:** Enter the password for the LDAP username.
- h) **LDAP Search Base:** Specify a starting point in the directory tree from which to search. Separate domain components [dc] with a comma. Example dc=cv2bu,dc=com
- i) **LDAP Last Name Filter:** This defines the search for surnames [sn], known as last name in some parts of the world. Example sn:(sn=*\$VALUE*). This search allows the provided text to appear anywhere in a name, beginning, middle, or end.
- j) **LDAP First Name Filter:** This defines the search for the common name [cn]. Example cn:(cn=*\$VALUE*). This search allows the provided text to appear anywhere in a name, beginning, middle, or end.
- k) **LDAP Search Item 3:** Additional customized search item. Can be blank if not needed.
- l) **LDAP Item 3 Filter:** Customized filter for the searched item. Can be blank if not needed.
- m) **LDAP Search Item 4:** Additional customized search item. Can be blank if not needed.
- n) **LDAP item 4 Filter:** Customized filter for the searched item. Can be blank if not needed.
- o) **LDAP Display Attrs:** Format of LDAP results display on phone where:
 - a—Attribute name
 - cn—Common name
 - sn—Surname (last name)
 - telephoneNumber—phone number
 - n—Display name
Example: n=Phone will cause "Phone:" to be displayed in front of the phone number of an LDAP query result when the detail soft button is pressed.
 - t—type
When t=p, that is, t is of type phone number, then the retrieved number can be dialed. Only one number can be made dialable. If two numbers are defined as dialable, only the first number is used. Example: a=ipPhone, t=p; a=mobile, t=p;
This example results in only the IP Phone number being dialable and the mobile number will be ignored.

Configuring LDAP Directory Search on SPA SIP IP Phones

- p—phone number
When p is assigned to a type attribute, example t=p, then the retrieved number will be dialable by the phone

p) **LDAP Number Mapping:** Can be blank if not needed.

With the LDAP number mapping, you can manipulate the number that was retrieved from the LDAP server in the same way that you use dial plans to manipulate dialed numbers

For example, you can add a prefix of 9 to the retrieved number if your dial plan requires a 9 to dial an outside line. Add the 9 prefix by adding (<:9xx.>) to the LDAP Number Mapping field. Example 555 1212 would become 9555 1212.

LDAP Last Name Filter:	sn:(sn=*\$VALUE*)	LDAP
LDAP Search Item 3:		LDAP
LDAP Search Item 4:		LDAP
LDAP Display Attrs:	a=cn;a=sn;a=telephoneNumber,	
LDAP Number Mapping:	(<:9>xx.)	

- q) If you do not manipulate the number in this fashion, a user can use the Edit Dial feature to edit the number before dialing out.

Below is an example of a completed LDAP Corporate Directory Search:

LDAP Corporate Directory Search			
LDAP Dir Enable:	yes	LDAP Corp Dir Name:	HR Directory
LDAP Server:	12.19.89.233	LDAP Auth Method:	DIGEST-MD5
LDAP Client DN:	dc=cv2bu,dc=com		
LDAP Username:	root	LDAP Password:	*****
LDAP Search Base:	dc=cv2bu,dc=com		
LDAP Last Name Filter:	sn:(sn=*\$VALUE*)	LDAP First Name Filter:	cn:(cn=*\$VALUE*)
LDAP Search Item 3:		LDAP Item 3 Filter:	
LDAP Search Item 4:		LDAP item 4 Filter:	
LDAP Display Attrs:	a=cn;a=sn;a=telephoneNumber,n=Phone,t=p;		
LDAP Number Mapping:			

5. Reboot the phone.
6. Following the instructions in the "Using LDAP" section to perform a test directory search on the phone to verify functionality.

Using LDAP

1. Press the **Directory** soft key on the SPA phone.
2. Select the LDAP Corporate Directory from the list. The name will vary depending on the entry in
Phone tab > LDAP Corporate Directory Search > LDAP Corp Dir Name.
3. Enter the search parameters for Last Name and First name, as needed.
4. Press the **Submit** soft key.
5. Press **Dial**, **EditDial**, **Detail**, or **Cancel** to use the LDAP results.

FAQs

Will the number of entries in the LDAP database affect the performance of the feature?

No, the performance is dependent on the LDAP server, not on the LDAP client.

Is there a limit to the number of responses that can be displayed?

Yes, 20 is the maximum number of search results that can be displayed. More than 20 results cause the following message to appear on the phone; "Too many matches for "\$Query". Please refine your search."

I need help with my configuration. What information will support need in order to help me?

Support will need at least the following information:

- Phone's configuration
To save the configuration, display any page of the web UI. From the File menu of the web browser, choose Save As. Save the file as Web Page Complete, with the name spa9x2.html.
- LDAP Server information
- Server authentication method
- WireShark trace

What LDAP messages does the phone display?

The SPA Phones display the following LDAP Messages:

- **Query LDAP**
No match found
- **Query LDAP Result**
1 <name found>
<number found>
- **Query LDAP**
Invalid input/configuration
Please check your input/configuration
- **LDAP Error**
Cannot connect to server

Troubleshooting LDAP

LDAP sequence

There are 3 steps to the LDAP query sequence:

1. Bind request [from LDAP client to LDAP server] ➡
1. Bind response [bind in progress] [from LDAP server to LDAP client] ⬅
2. Bind request [from LDAP client to LDAP server] ➡
2. Bind response [from LDAP server to LDAP client] ⬅
3. Search request [from LDAP client to LDAP server] ➡
3. Search results [from LDAP server to LDAP client] ⬅
3. Search done [from LDAP server to LDAP client] ⬅

Following is a sample trace showing a successful LDAP query sequence:

```

Source          Destination    Protocol Info
LDAP client     LDAP server   LDAP 65054 > ldap [ACK] Seq=1 Ack=1 Win=16000 Len=41|
bindRequest(1) "dc=cv2bu,dc=com" sasl
LDAP server     LDAP client   LDAP bindResponse(1) saslBindInProgress (SASL(0): successful
result: )
LDAP client     LDAP server   LDAP bindRequest(2) "dc=cv2bu,dc=com" sasl
LDAP server     LDAP client   LDAP bindResponse(2) success
LDAP client     LDAP server   LDAP searchRequest(3) "dc=cv2bu,dc=com" wholeSubtree
LDAP server     LDAP client   LDAP searchResEntry(3) "cn=Patrick Born,dc=cv2bu,dc=com"
LDAP server     LDAP client   LDAP searchResDone(3) success
    
```

Sample LDAP Traces

Sometimes, the best way to troubleshoot LDAP issues is to capture a trace and compare it against a similar transaction. Following are three traces showing in order:

1. A successful LDAP search
2. An unsuccessful LDAP search due to an incorrectly configured LDAP client username
3. An unsuccessful LDAP search due to an incorrectly configured LDAP client password

Trace of Successful Search

Trace shows response to query when phone is properly configured and query is for an existing entry with a last name of "Born."

Phone displays message:

Query LDAP Result

No.	Time	Source	Destination	Protocol	Info
306	74.535567	192.168.2.23	12.19.89.233	LDAP	bindRequest(1) "dc=cv2bu,dc=com" sasl

```

Frame 306 (95 bytes on wire, 95 bytes captured)
Ethernet II, Src: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d), Dst: Cisco-Li_9c:e3:2c
(00:1d:7e:9c:e3:2c)
Internet Protocol, Src: 192.168.2.23 (192.168.2.23), Dst: 12.19.89.233 (12.19.89.233)
Transmission Control Protocol, Src Port: 65054 (65054), Dst Port: ldap (389), Seq: 1, Ack: 1,
Len: 41
Lightweight-Directory-Access-Protocol
LDAPMessage bindRequest(1) "dc=cv2bu,dc=com" sasl
  messageID: 1
  protocolOp: bindRequest (0)
    
```


Configuring LDAP Directory Search on SPA SIP IP Phones

```

bindRequest
  version: 3
  name: dc=cv2bu,dc=com
  authentication: sasl (3)
  sasl
    mechanism: DIGEST-MD5
[Response In: 308]

No.      Time      Source      Destination      Protocol Info
308 74.560617 12.19.89.233 192.168.2.23    LDAP      bindResponse(1)
sasBindInProgress (SASL(0): successful result: )

Frame 308 (292 bytes on wire, 292 bytes captured)
Ethernet II, Src: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c), Dst: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d)
Internet Protocol, Src: 12.19.89.233 (12.19.89.233), Dst: 192.168.2.23 (192.168.2.23)
Transmission Control Protocol, Src Port: ldap (389), Dst Port: 65054 (65054), Seq: 1, Ack: 42, Len: 238
Lightweight-Directory-Access-Protocol
  LDAPMessage bindResponse(1) sasBindInProgress (SASL(0): successful result: )
    messageID: 1
    protocolOp: bindResponse (1)
      bindResponse
        [Response To: 306]
        [Time: 0.025050000 seconds]

No.      Time      Source      Destination      Protocol Info
309 74.587337 192.168.2.23 12.19.89.233    LDAP      bindRequest(2)
"dc=cv2bu,dc=com" sasl

Frame 309 (317 bytes on wire, 317 bytes captured)
Ethernet II, Src: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d), Dst: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c)
Internet Protocol, Src: 192.168.2.23 (192.168.2.23), Dst: 12.19.89.233 (12.19.89.233)
Transmission Control Protocol, Src Port: 65054 (65054), Dst Port: ldap (389), Seq: 42, Ack: 239, Len: 263
Lightweight-Directory-Access-Protocol
  LDAPMessage bindRequest(2) "dc=cv2bu,dc=com" sasl
    messageID: 2
    protocolOp: bindRequest (0)
      bindRequest
        version: 3
        name: dc=cv2bu,dc=com
        authentication: sasl (3)
        sasl
          mechanism: DIGEST-MD5
          credentials: 757365726E616D653D22726F6F74222C7265616C6D3D2261...
          GSS-API Generic Security Service Application Program Interface
        [Response In: 310]

No.      Time      Source      Destination      Protocol Info
310 74.613021 12.19.89.233 192.168.2.23    LDAP      bindResponse(2)
success

Frame 310 (110 bytes on wire, 110 bytes captured)
Ethernet II, Src: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c), Dst: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d)
Internet Protocol, Src: 12.19.89.233 (12.19.89.233), Dst: 192.168.2.23 (192.168.2.23)
Transmission Control Protocol, Src Port: ldap (389), Dst Port: 65054 (65054), Seq: 239, Ack: 305, Len: 56
Lightweight-Directory-Access-Protocol
  LDAPMessage bindResponse(2) success
    messageID: 2
    protocolOp: bindResponse (1)
      bindResponse
        [Response To: 309]
        [Time: 0.025684000 seconds]

No.      Time      Source      Destination      Protocol Info
311 74.637286 192.168.2.23 12.19.89.233    LDAP      searchRequest(3)
"dc=cv2bu,dc=com" wholeSubtree

Frame 311 (136 bytes on wire, 136 bytes captured)
Ethernet II, Src: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d), Dst: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c)
Internet Protocol, Src: 192.168.2.23 (192.168.2.23), Dst: 12.19.89.233 (12.19.89.233)
Transmission Control Protocol, Src Port: 65054 (65054), Dst Port: ldap (389), Seq: 305, Ack: 295, Len: 82
Lightweight-Directory-Access-Protocol
  LDAPMessage searchRequest(3) "dc=cv2bu,dc=com" wholeSubtree
    messageID: 3
    protocolOp: searchRequest (3)
      searchRequest
        baseObject: dc=cv2bu,dc=com
        scope: wholeSubtree (2)

```

Configuring LDAP Directory Search on SPA SIP IP Phones

```

derefAliases: derefAlways (3)
sizeLimit: 20
timeLimit: 0
typesOnly: False
Filter: (sn=*Born*)
  filter: and (0)
    and: (sn=*Born*)
    and: 1 item
      Filter: (sn=*Born*)
        Item: substrings (4)
          substring: (sn=*Born*)
            substrings sn
              type: sn
              substrings: 1 item
                Item: any (1)
                  any: Born
          attributes: 3 items
[Response In: 312]

No.      Time      Source      Destination      Protocol Info
  312 74.665127 12.19.89.233 192.168.2.23    LDAP      searchResEntry(3)
"cn=Patrick Born,dc=cv2bu,dc=com"

Frame 312 (161 bytes on wire, 161 bytes captured)
Ethernet II, Src: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c), Dst: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d)
Internet Protocol, Src: 12.19.89.233 (12.19.89.233), Dst: 192.168.2.23 (192.168.2.23)
Transmission Control Protocol, Src Port: ldap (389), Dst Port: 65054 (65054), Seq: 295, Ack: 387, Len: 107
Lightweight-Directory-Access-Protocol
  LDAPMessage searchResEntry(3) "cn=Patrick Born,dc=cv2bu,dc=com" [1 result]
    messageID: 3
    protocolOp: searchResEntry (4)
      searchResEntry
        objectName: cn=Patrick Born,dc=cv2bu,dc=com
        attributes: 3 items
      [Response To: 311]
      [Time: 0.027841000 seconds]

No.      Time      Source      Destination      Protocol Info
  313 74.665427 12.19.89.233 192.168.2.23    LDAP      searchResDone(3)
success [1 result]

Frame 313 (68 bytes on wire, 68 bytes captured)
Ethernet II, Src: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c), Dst: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d)
Internet Protocol, Src: 12.19.89.233 (12.19.89.233), Dst: 192.168.2.23 (192.168.2.23)
Transmission Control Protocol, Src Port: ldap (389), Dst Port: 65054 (65054), Seq: 402, Ack: 387, Len: 14
Lightweight-Directory-Access-Protocol
  LDAPMessage searchResDone(3) success [1 result]
    messageID: 3
    protocolOp: searchResDone (5)
      searchResDone
        resultCode: success (0)
        matchedDN:
        errorMessage:
      [Response To: 311]
      [Time: 0.028141000 seconds]

```

Trace of LDAP Query Using Invalid User Name:

Trace shows response to query when phone is configured with invalid LDAP client user name.

Phone displays message:

LDAP Error: cannot connect to server

```

No.      Time      Source      Destination      Protocol Info
  56 15.968392 192.168.2.23 12.19.89.233    LDAP      bindRequest(1)
"dc=cv2bu,dc=com" sasl

Frame 56 (95 bytes on wire, 95 bytes captured)
Ethernet II, Src: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d), Dst: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c)
Internet Protocol, Src: 192.168.2.23 (192.168.2.23), Dst: 12.19.89.233 (12.19.89.233)
Transmission Control Protocol, Src Port: dicom (11112), Dst Port: ldap (389), Seq: 1, Ack: 1, Len: 41
Lightweight-Directory-Access-Protocol
  LDAPMessage bindRequest(1) "dc=cv2bu,dc=com" sasl
    messageID: 1
    protocolOp: bindRequest (0)
      bindRequest
        version: 3

```

Configuring LDAP Directory Search on SPA SIP IP Phones

```

        name: dc=cv2bu,dc=com
        authentication: sasl (3)
            sasl
                mechanism: DIGEST-MD5
    [Response In: 58]

No.      Time      Source      Destination      Protocol Info
   58 15.992757 12.19.89.233 192.168.2.23    LDAP      bindResponse(1)
saslBindInProgress (SASL(0): successful result: )

Frame 58 (292 bytes on wire, 292 bytes captured)
Ethernet II, Src: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c), Dst: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d)
Internet Protocol, Src: 12.19.89.233 (12.19.89.233), Dst: 192.168.2.23 (192.168.2.23)
Transmission Control Protocol, Src Port: ldap (389), Dst Port: dicom (11112), Seq: 1, Ack: 42, Len: 238
Lightweight-Directory-Access-Protocol
LDAPMessage bindResponse(1) saslBindInProgress (SASL(0): successful result: )
  messageID: 1
  protocolOp: bindResponse (1)
    bindResponse
      resultCode: saslBindInProgress (14)
      matchedDN:
      errorMessage: SASL(0): successful result:
      serverSaslCreds: 6E6F6E63653D227644445932485142616B4D777A6A775030...
    [Response To: 56]
    [Time: 0.024365000 seconds]

No.      Time      Source      Destination      Protocol Info
   59 16.020942 192.168.2.23 12.19.89.233    LDAP      bindRequest(2)
"dc=cv2bu,dc=com" sasl

Frame 59 (316 bytes on wire, 316 bytes captured)
Ethernet II, Src: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d), Dst: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c)
Internet Protocol, Src: 192.168.2.23 (192.168.2.23), Dst: 12.19.89.233 (12.19.89.233)
Transmission Control Protocol, Src Port: dicom (11112), Dst Port: ldap (389), Seq: 42, Ack: 239, Len: 262
Lightweight-Directory-Access-Protocol
LDAPMessage bindRequest(2) "dc=cv2bu,dc=com" sasl
  messageID: 2
  protocolOp: bindRequest (0)
    bindRequest
      version: 3
      name: dc=cv2bu,dc=com
      authentication: sasl (3)
        sasl
          mechanism: DIGEST-MD5
          credentials: 757365726E616D653D22726F74222C7265616C6D3D226173...
          GSS-API Generic Security Service Application Program Interface
          Unknown header (class=1, pc=1, tag=21)
        [Response In: 60]

No.      Time      Source      Destination      Protocol Info
   60 16.057198 12.19.89.233 192.168.2.23    LDAP      bindResponse(2)
invalidCredentials (SASL(-13): user not found: no secret in database)

Frame 60 (116 bytes on wire, 116 bytes captured)
Ethernet II, Src: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c), Dst: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d)
Internet Protocol, Src: 12.19.89.233 (12.19.89.233), Dst: 192.168.2.23 (192.168.2.23)
Transmission Control Protocol, Src Port: ldap (389), Dst Port: dicom (11112), Seq: 239, Ack: 304, Len: 62
Lightweight-Directory-Access-Protocol
LDAPMessage bindResponse(2) invalidCredentials (SASL(-13): user not found: no secret in database)
  messageID: 2
  protocolOp: bindResponse (1)
    bindResponse
      resultCode: invalidCredentials (49)
      matchedDN:
      errorMessage: SASL(-13): user not found: no secret in database
    [Response To: 59]
    [Time: 0.036256000 seconds]

```

Trace of LDAP Query Using Incorrect Password:

Trace shows response to query when phone is configured with invalid LDAP client password.

Phone displays message:

LDAP Error: cannot connect to server

No.	Time	Source	Destination	Protocol	Info
66	15.980094	192.168.2.23	12.19.89.233	LDAP	bindRequest(1)

"dc=cv2bu,dc=com" sasl

Frame 66 (95 bytes on wire, 95 bytes captured)
 Ethernet II, Src: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d), Dst: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c)
 Internet Protocol, Src: 192.168.2.23 (192.168.2.23), Dst: 12.19.89.233 (12.19.89.233)
 Transmission Control Protocol, Src Port: 55418 (55418), Dst Port: ldap (389), Seq: 1, Ack: 1, Len: 41

```

Lightweight-Directory-Access-Protocol
  LDAPMessage bindRequest(1) "dc=cv2bu,dc=com" sasl
    messageID: 1
    protocolOp: bindRequest (0)
      bindRequest
        version: 3
        name: dc=cv2bu,dc=com
        authentication: sasl (3)
          sasl
            mechanism: DIGEST-MD5
    [Response In: 68]
    
```

No.	Time	Source	Destination	Protocol	Info
68	16.005258	12.19.89.233	192.168.2.23	LDAP	bindResponse(1)

saslBindInProgress (SASL(0): successful result:)

Frame 68 (292 bytes on wire, 292 bytes captured)
 Ethernet II, Src: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c), Dst: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d)
 Internet Protocol, Src: 12.19.89.233 (12.19.89.233), Dst: 192.168.2.23 (192.168.2.23)
 Transmission Control Protocol, Src Port: ldap (389), Dst Port: 55418 (55418), Seq: 1, Ack: 42, Len: 238

```

Lightweight-Directory-Access-Protocol
  LDAPMessage bindResponse(1) saslBindInProgress (SASL(0): successful result: )
    messageID: 1
    protocolOp: bindResponse (1)
      bindResponse
        resultCode: saslBindInProgress (14)
        matchedDN:
        errorMessage: SASL(0): successful result:
        serverSaslCreds: 6E6F6E63653D224B325263685566666B754F51456F356639...
    [Response To: 66]
    [Time: 0.025164000 seconds]
    
```

No.	Time	Source	Destination	Protocol	Info
69	16.032048	192.168.2.23	12.19.89.233	LDAP	bindRequest(2)

"dc=cv2bu,dc=com" sasl

Frame 69 (317 bytes on wire, 317 bytes captured)
 Ethernet II, Src: CiscoLin_dd:57:5d (00:0e:08:dd:57:5d), Dst: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c)
 Internet Protocol, Src: 192.168.2.23 (192.168.2.23), Dst: 12.19.89.233 (12.19.89.233)
 Transmission Control Protocol, Src Port: 55418 (55418), Dst Port: ldap (389), Seq: 42, Ack: 239, Len: 263

```

Lightweight-Directory-Access-Protocol
  LDAPMessage bindRequest(2) "dc=cv2bu,dc=com" sasl
    messageID: 2
    protocolOp: bindRequest (0)
      bindRequest
        version: 3
        name: dc=cv2bu,dc=com
        authentication: sasl (3)
          sasl
            mechanism: DIGEST-MD5
            credentials: 757365726E616D653D22726F6F74222C7265616C6D3D2261...
            GSS-API Generic Security Service Application Program Interface
            Unknown header (class=1, pc=1, tag=21)
    [Response In: 70]
    
```

No.	Time	Source	Destination	Protocol	Info
70	16.072510	12.19.89.233	192.168.2.23	LDAP	bindResponse(2)

invalidCredentials (SASL(-13): authentication failure: client response doesn't match what we generated)

Configuring LDAP Directory Search on SPA SIP IP Phones

```
Frame 70 (150 bytes on wire, 150 bytes captured)
Ethernet II, Src: Cisco-Li_9c:e3:2c (00:1d:7e:9c:e3:2c), Dst: CiscoLin_dd:57:5d
(00:0e:08:dd:57:5d)
Internet Protocol, Src: 12.19.89.233 (12.19.89.233), Dst: 192.168.2.23 (192.168.2.23)
Transmission Control Protocol, Src Port: ldap (389), Dst Port: 55418 (55418), Seq: 239, Ack:
305, Len: 96
Lightweight-Directory-Access-Protocol
  LDAPMessage bindResponse(2) invalidCredentials (SASL(-13): authentication failure: client
response doesn't match what we generated)
    messageID: 2
    protocolOp: bindResponse (1)
      bindResponse
        resultCode: invalidCredentials (49)
        matchedDN:
        errorMessage: SASL(-13): authentication failure: client response doesn't match
what we generated
      [Response To: 69]
      [Time: 0.040462000 seconds]
```

Gathering Information for Support

In the event that you need to reach out for support, collect the following information first: --I like having this as a separate section. The duplicated information could be removed from Troubleshooting.

- A. Phone's configuration
Browser > File > Save As > [save entire page as spa9x2.html]
- B. LDAP Server information
- C. Server authentication method
- D. WireShark trace



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

CCDE, CCENT, Cisco Eos, Cisco Lumin, Cisco Nexus, Cisco StadiumVision, Cisco TelePresence, Cisco WebEx, the Cisco logo, DCE, and Welcome to the Human Network are trademarks; Changing the Way We Work, Live, Play, and Learn and Cisco Store are service marks; and Access Registrar, Aironet, AsyncOS, Bringing the Meeting To You, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, CCVP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Collaboration Without Limitation, EtherFast, EtherSwitch, Event Center, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, iQuick Study, IronPort, the IronPort logo, LightStream, Linksys, MediaTone, MeetingPlace, MeetingPlace Chime Sound, MGX, Networkers, Networking Academy, Network Registrar, PCNow, PIX, PowerPanels, ProConnect, ScriptShare, SenderBase, SMARTnet, Spectrum Expert, StackWise, The Fastest Way to Increase Your Internet Quotient, TransPath, WebEx, and the WebEx logo are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0809R)